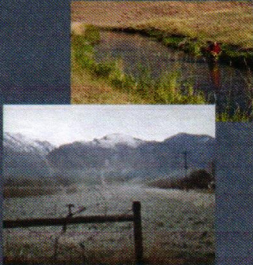


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Ground Water Investigation Program (GWIP)


- ✓ Answer *locally identified questions*, crucial for water management;
- ✓ *Focused*, intensive studies
- ✓ *Unbiased* research



Provide information so aquifers can be managed, Not just used

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GWIP Project Areas



Projects selected by a statewide steering committee

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Exempt wells

Hydrogeologist perspective...

- ✓ Aquifer drawdown potentially affecting existing wells
- ✓ Stream depletion – flow that would normally flow to the stream is intercepted

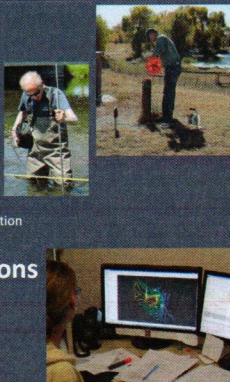
The Facts

- ✓ 90% of wells are exempt wells, use 12% of our groundwater
- ✓ Magnitude and timing of stream depletion depends on
aquifer properties
the distance between well and the stream
- ✓ Amount of stream depletion ultimately equals the amount of water removed
from the aquifer.
- ✓ Real impacts but within margin of error for stream measurements.

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Data

- ✓ Aquifer characteristics
 - Geology
 - Transmissivity, storage
 - Confined, unconfined
- ✓ Ground Water levels
- ✓ Surface water flows
- ✓ Amount consumed
- ✓ The ground-water/surface water connection



Hydrogeologic Interpretations

- ✓ Water budget
- ✓ Model the system

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Groundwater Flow Models

Used to represent natural groundwater flow

- ✓ 3-D digital representation of groundwater and surface waters
- ✓ Developed using field data
- ✓ Discrete cells in which inflows and outflows are parameterized according to aquifer characteristics

Used to predict the effects of hydrological changes

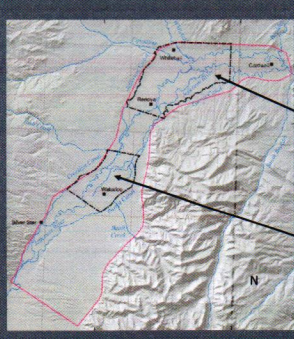
- ✓ Assess impacts that cannot be measured in the field,
- ✓ Cumulative impacts,
- ✓ Evaluate potential future scenarios



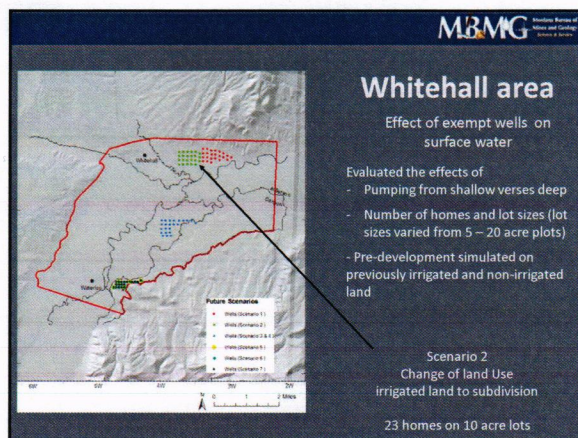
"... ground water models are only as good as the data and personnel compiling them."

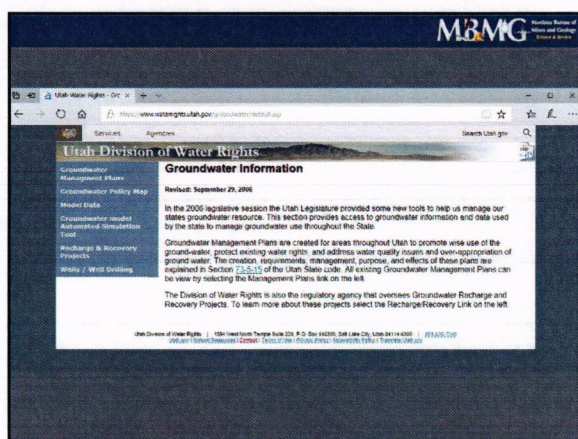
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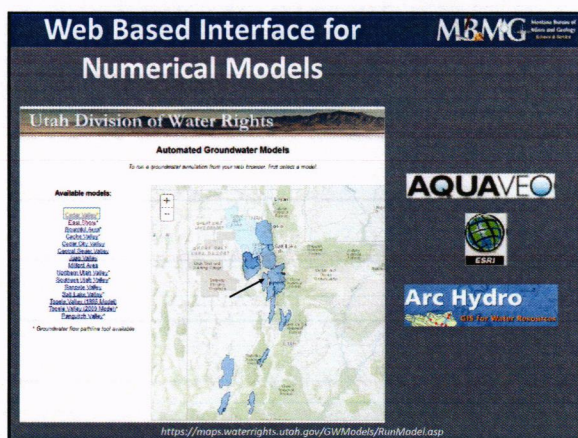
Upper Jefferson GWIP

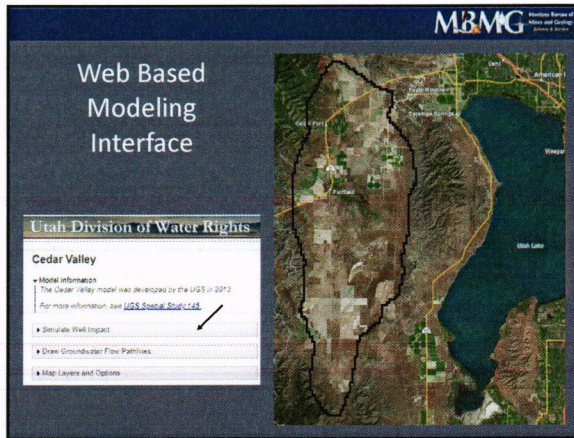


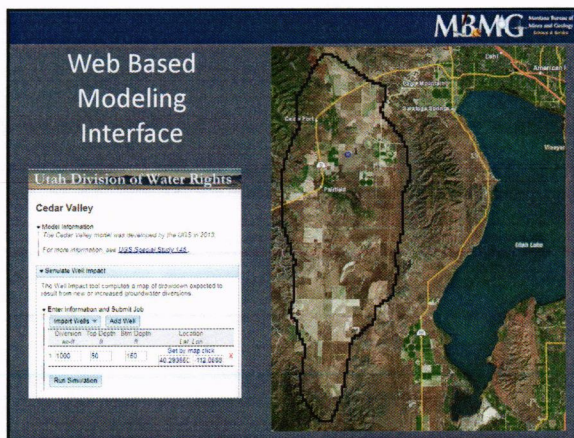
- ✓ Evaluate the potential increased groundwater development on the Jefferson River and Jefferson Slough
- ✓ Effect of potential changes in irrigation practices on Parson's Slough, Willow Springs, and the Jefferson River.

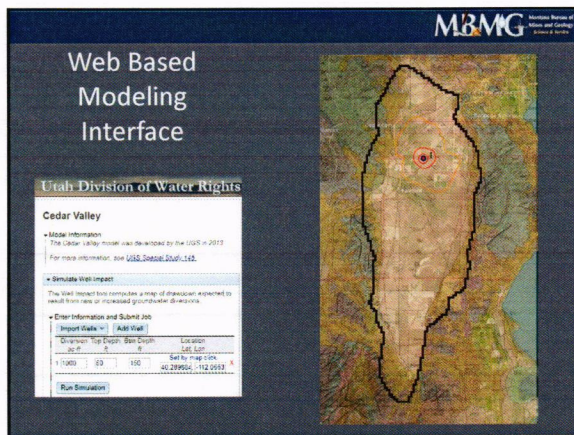














The diagram illustrates the Ground Water Steering Committee structure. At the top, the Montana Department of Natural Resources & Conservation (DNRC) is shown as the lead agency, with the Montana Department of Agriculture (MDA) and the Montana Department of Transportation (MDT) as advisory members. The DNRC is connected to the Governor's Office, which oversees the Governor's Appointees. The Governor's Appointees are connected to the Agricultural Water Users Conservation Organization (AWUCO). The AWUCO is connected to the Industrial Water Users (IWU) and the Development (DEV) sectors. The DNRC is also connected to the State Library, the Department of Environmental Quality (DEQ), and the Montana Department of Agriculture (MDA). The DEQ is connected to the Montana Department of Agriculture (MDA). The MDA is connected to the Montana Department of Transportation (MDT). The MDT is connected to the Montana Department of Natural Resources & Conservation (DNRC).
